HIGH PERFORMANCE SEMICONDUCTOR DEVICES FABRICATED WITH STRAIN-INDUCED PROCESSES AND METHODS FOR MAKING SAME

ABSTRACT

[0041] A high performance semiconductor device and the method for making same is disclosed with an improved drive current. The semiconductor device has source and drain regions built on an active region, a length of the device being different than a width thereof. One or more isolation regions are fabricated surrounding the active region, the isolation regions are then filled with an predetermined isolation material whose volume shrinkage exceeds 0.5% after an anneal process. A gate electrode is formed over the active region, and one or more dielectric spacers are made next to the gate electrode. Then, a contact etch stopper layer is put over the device, wherein the isolation regions, spacers and contact etch layer contribute to modulating a net strain imposed on the active region so as to improve the drive current.